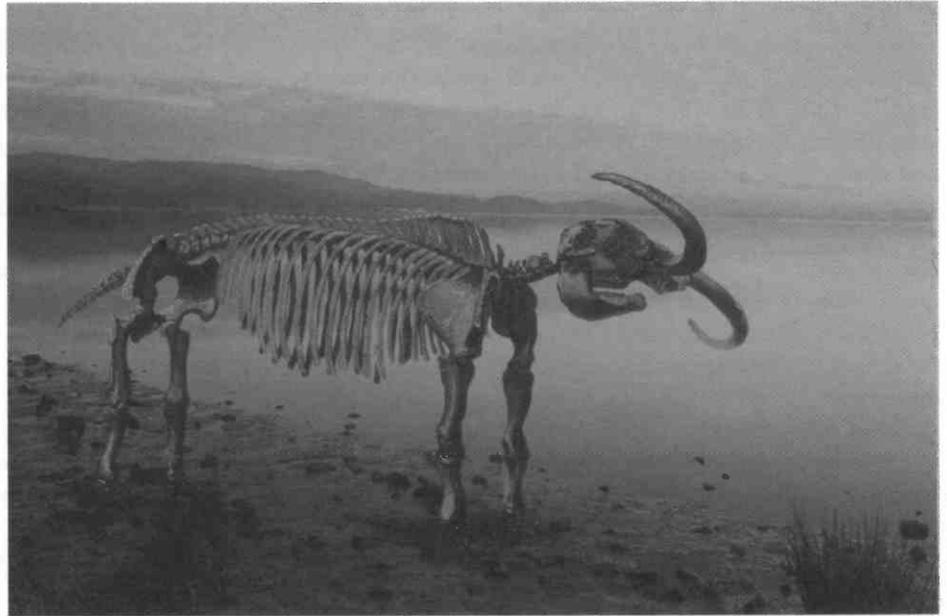




The photo by Ellen Land-Weber to the right is of Arcata Marsh, a constructed wetland in northern California. Arcata Marsh is an abandoned industrial site converted to a constructed wetland to treat wastewater from a nearby city. The picture is part of a series of photographs that Land-Weber has taken of the marsh. In this and other photographs, Land-Weber uses traditional landscape photography techniques and digital composite imaging. The digital imaging combines photographs of the marsh with a skeleton of the extinct mammoth. This theme repeats in some of her other photos, with antique illustrations of various, sometimes extinct animals shown in the Arcata Marsh environment. Some of her titles are suggestive of Darwinian principles and environmental issues; e.g., *Survival of the Fittest at the Arcata Marsh and Arcata Marsh Slough After Global Warming*.

Land-Weber is a contributor to the "Water in the West" archive which is located at the University of Arizona's Center for Creative Photography. The "Water in the West" archive is a photographic response to concerns about water supply and use in the American West. See page 9 for further description of the UA archive.



Marsh Mammoth, 1999, photograph by Ellen Land-Weber. Ms. Land-Weber is on the faculty of Humboldt State University.

Arizona's Care of Historical Water Records Shortsighted

Knowledge of State's Water Heritage at Stake

In working to ensure adequate water supplies, a quest that is critical and ongoing, officials must not overlook another concern of great importance — the collection and preservation of state water records and information. Obtaining consumable water supplies and managing permanent state water records are both areas of concern.

A caretaker of government documents and a central informational resource, the Arizona State Archives is a resource in need, its facilities woefully inadequate to meet its official responsibilities. The agency is the legally mandated repository of permanent state records, with holdings that include many water-related materials. According to acting state archives director Melanie Sturgeon, the archives has about 500 to 600 cubic feet of water records.

Materials include many unpublished, one-of-a-kind documents, the sole source of some state water records. Archival collections concerning water span many years, from early territorial times to statehood, with historical records from both organizations and individuals. Archival holdings include documents from the 1952-63 *Arizona v. California* Supreme Court case and the manuscript collection of George Hebard Maxwell, who was active in the passage of the 1902 National Reclamation Act. The State Archives is the designated repository for records from the Arizona Department of Water Resources, Department of Environmental Quality and papers and documents relating to the ongoing adjudication proceedings. The State Archives is the primary custodian of much information relating to Arizona's water heritage.

Continued on page 2



C O N T E N T S

Water Vapors	3
News Briefs	4
AZ Water	
Community News	5
Guest View	6
Legislation and Law	7
Publications	8
Special Projects	9
Announcements	10
Calendar of Events	11

Continued from page 1

Such valuable materials, however, are now literally stored in an attic, in space above the fourth floor of the old capital building built in 1901. The storage space lacks climate control and is without a fire detection and suppression system. Further, the building was constructed with dumb waiters that would act as a fire route to the upper regions of the building. Exposed water pipes along the ceiling are a potential source of water damage.

Some belated relief, however, is forthcoming. This year the Legislature passed SB 128, a bill signed by the governor which provides funding for renovation of the present inoperable fire detection system in the archives. The bill also provides for the first time the installation of a fire-suppression system in the archive facility.

Other problems exist. Some researchers using the facility complain of insufficient work space and outdated microfilm readers. Occasionally all table spaces at the archives are occupied. A recent relocation of all customer service facilities onto the third floor of the capitol has provided a one-stop location for researchers, but the improved access has taxed the limited space available and the ability of staff to respond.

Another serious deficiency is the facility's lack of storage space. Located in a confined area with limited room, the archives is unable to accept much incoming materials. Sturgeon says surveys show that many government records, including those having to do with water "... are just sitting out there waiting to come into the archives." For example, in 1983 a state-sponsored survey funded by the National Historical Publications and Records Commission found that a lack of storage space was the biggest problem then facing the archives. Conducted by archival consultant John W. Irwin, the survey identified about 20,000 cubic feet of government records that belong in the archives. And the quantity of such records has no doubt greatly increased since that time.

Sturgeon says, "Since I have been here — and I have been here for four years — we have had to turn away a couple thousand cubic feet of records because we did not have the space."

As a result, records that otherwise would be processed and available to researchers remain in boxes at different government agencies, neither known nor particularly accessible to interested persons. For example, the various counties have extensive records

"Decision makers need to be educated about the value of historic documents. While only a small number of people may actually work with the records, the impact of their research on the greater society is tremendous. For example, documentation in toxic tort cases can affect class action lawsuits which impact entire communities. Establishing and protecting water rights is an action that can affect millions." Douglas E. Kupel, Historian, City of Phoenix Law Department.

of court cases relating to water, with some cases dating to early territorial times. Accessibility to this material is important since it is often used in current litigation. With space unavailable at the State Archives, counties often do what they can to make room for the records. Sometimes they are not properly stored.

A lack of space at the archives not only excludes present and

past materials but also means future water records also will be left out. For example, the state's ongoing adjudication proceedings for the Little Colorado and Gila rivers is spawning voluminous records. Suitable space for such important records is presently lacking at the State Archives.

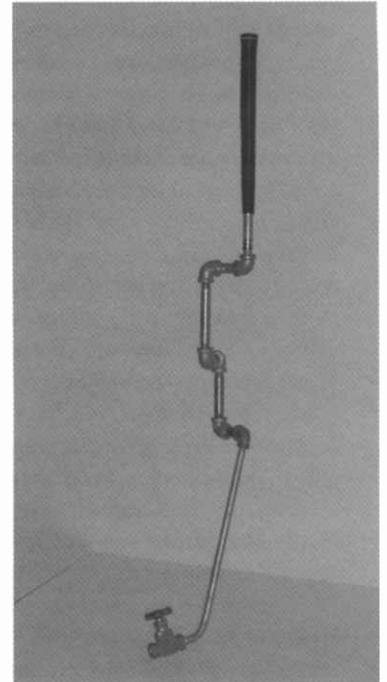
Further, by not accepting incoming materials, the archives runs the risk that such materials might be discarded or destroyed by an agency anxious to be rid of its old records. The message that is sent when the official archives lacks the space to accept materials that by law should be deposited there is that the documents are not that important.

In estimating the amount of records destroyed since territorial times, Sturgeon offers an interesting computation. She says that if the destroyed records were boxed they would fill the seating of the Bank One Ballpark, with two boxes per seat.

Some counties have been especially remiss in their care of water records, with a couple of the counties having lost up to 30 years of civil case records. Historian Doug Kupel tells of examining 1930 court records at Maricopa Superior Court that had to do with Salt River Project's classification of water types. In 1990, when Kupel first briefly examined the voluminous transcripts and planned to return to copy the entire document

if needed for litigation research. When he returned five years later for further research, the transcripts were gone, having been destroyed in a county space-saving drive. Kupel says, "This points to the need to improve the State Archives, so that materials can be accepted from the counties."

The state records management division or "records center" also houses historical records. In fact, of the 14,000 cubic feet of state archival records, 8,000 cubic feet or about three fourths of the collection, including most of the water records, are stored at this facility. This material deserves better. The actual purpose of the record center is to temporarily store materials scheduled for destruction. Conditions therefore are not necessarily suitable for preserving historically significant documents. For example, the swamp coolers used in the facility circulate humidity and dust, causing damage to archival records. A combination of heavy rains and a leaking roof



The above is a "CAP putter" from the Morris Udall Collection at the University of Arizona's Department of Special Collections. While the State Archives collects mainly print documents, university archives may include such personal items as the CAP putter, constructed of CAP fittings.

Continued on page 12



Water Vapors

Checking Air and Groundwater Quality

Several recent technological developments deserve honorable mention. NASA is engaged in a project called E-Nose, an electronic "nose" to sniff out hazardous odors, before crew members suffer adverse effects. The mining industry once relied on canaries.

Compared to airborne odors, groundwater is more difficult to monitor because of its special conditions. Remote and out of sight, almost an abstraction to most people, groundwater is more difficult to know and understand than surface water. With a newly patented USGS robotic groundwater technology, however, scientists will be better able to track groundwater conditions. Robotwell will measure water levels and water quality on a regular schedule at a groundwater monitoring well. More information about Robotwell is available at <http://ma.water.usgs.gov/automon/>

Technology for the Masses

Robotwell no doubt represents a technological advance, but what of Aquaroid? Aquaroid is a line of robot fish for sale by Japan's Takara Company. With Aquaroids, an aquarium can be stocked with such sub-surface critters as plastic sunfish, bobbing jellyfish with plastic tentacles and a crab with plastic pincers. Each of the robot fish costs about \$140.

The uses of technology are many, from the serious and useful to the frivolous, from Robotwell to Aquaroid. But a more direct connection between a serious and not-so-serious use of technology is demonstrated by the story of the development of a water gun.

In 1982, Lonnie Johnson was an engineer at the Strategic Air Command in Omaha, Nebraska. He was working on a new type of heat pump that would use water instead of Freon. After hooking up a model of the pump to the bathroom sink in his home, Johnson found he could shoot a powerful stream of water across the room. "I thought this would make a great

water gun," said Johnson. Thus the SuperSoaker was born. Over 250 million of the high-tech water weapons have been sold, to both children and surprisingly to adults.

Water Gun Control

When human ingenuity is unleashed, human intervention often follows, at least it did in Detroit when local legislator Gil DeNello proposed a ban of Johnson's SuperSoaker invention. When the Detroit News asked him about the apparent contradiction between his unwavering opposition to the control of real guns and his proposed SuperSoaker ban, DeNello replied, "Real guns are intended to kill. The SuperSoaker is intended as a toy."

The exact meaning of that remark remains unclear. Does it imply that water's uselessness as a weapon disqualifies it for protection under the Second Amendment? Some Prescott officials evidently perceive water in balloons as posing a threat to public safety. The Prescott City Council voted to ban a water balloon fight between teenage combatants in what has been a warm-up event to the city's Frontier Days rodeo. Some downtown citizens and business owners said the event was getting out of control. With the new city ordinance, all water throwing and spraying on public property and across public right-of-way is abolished each year from July 1-10.

Justice is Served

In facing the resulting protests and opposition, Prescott supporters of the ban

might take heart from action taken in Tecumseh, Michigan. A teenager was charged with assault with a dangerous weapon after a woman walking with her husband was struck by a water balloon. The youth was arraigned on the felony charge and could face up to four years in prison. The balloon was tossed from his car as he traveled about 25 mph. "There are circumstances I suppose when a water balloon is relatively harmless," the judge said. "The water balloon moving at that velocity constituted a dangerous weapon."

Just When You Thought it Was Safe to Drink the Water...

Something about human nature loves a conspiracy. Recently when Tucsonans slugged it out on whether to allow domestic delivery of CAP water, *The Tucson Weekly*, the city alternative newspaper, claimed a conspiracy was afoot, with developers and city and water officials conspiring to trick unwary Tucson citizens into accepting CAP water. In the election, Tucsonans rejected *The Weekly's* position. Not having CAP to kick around anymore, *The Weekly* now sees another conspiracy lurking. Noting Southern California's plans to treat sewage water for drinking, the *The Weekly* wrote, "Drinking 'purified' poop water is just another way to sustain uncontrolled growth in the parched deserts of the American West. And you can bet we'll be doing it here soon enough..."



Arizona Water Resource is published 6 times per year by the University of Arizona's Water Resources Research Center. AWR accepts news, announcements and other information from all organizations

Arizona Water Resource Staff

Editor: Joe Gelt
 Editorial Assistant: Joel Spezeski
 Reporters: Val Little
 Barbara Tellman

WRRR Director: Dr. Peter Wierenga

Arizona Water Resource

Water Resources Research Center
 College of Agriculture
 The University of Arizona
 350 North Campbell Avenue
 Tucson, Arizona 85719

520-792-9592; FAX 520-792-8518
 Email: wrrc@ag.arizona.edu



News Briefs

Report Says Water Systems Critically Need Funding

A staggering water bill is about to come due according to a recent report. The infrastructure funding needs of the nation's 54,000 drinking water systems and 16,000 wastewater systems will be nearly \$1 trillion over the next 20 years, with a shortfall of a half a trillion dollars, according to Clean and Safe Water for the 21st Century, a re-

port of the Water Infrastructure Network (WIN). The report states that the \$23 billion now spent annually by America's drinking water and wastewater systems for infrastructure will still result in another \$23 billion annual shortfall, to replace aging facilities and meet existing and future federal water regulations.

WIN wants the federal government to consider investment in our critical drinking water and wastewater infrastructure a national priority. Without such an invest-

ment for the next 20 years, public health, economic and environmental progress may be halted, even reversed, the report notes.

"The benefits of drinking water and wastewater infrastructure to the nation's well-being cannot be overstated," says WIN. "The federal government should not make communities choose between providing safe and clean water and funding other necessary community programs."

An enhanced federal role is needed in providing assistance to drinking water and

Recent U.S. Supreme Court Actions Impact Arizona Water Affairs

Ruling Favors Tribe's Bid for Colorado River Water

The Quechan tribe recently scored a victory when the U.S. Supreme Court ruled that the tribe is entitled to seek additional water rights to the Colorado River. The Court ruling was in response to a dispute between the tribe and the states of Arizona and California.

The tribe claims that when its reservation was established in 1884 it was granted enough water to raise crops. In 1893, the tribe agreed to give up 25,000 acres in exchange for construction of irrigation canals. The canals never were built, and in 1983 the U.S. government acknowledged that the tribe was cheated and paid the Quechan \$15 million.

The tribe argues that it still owns the land and deserves the water to irrigate the land, and that the \$15 million was paid as compensation to the tribe for a history of trespass and broken promises. Arizona and California contend that the Quechan relinquished its land and associated water claims in accepting the payment. The tribe is claiming 78,519 acre-feet per year — one percent of the Lower Basin allocation of the Colorado River — that was awarded in a prior proceedings related to the case.

The 6-3 Supreme Court decision means the tribe will have the opportunity to prove its 25,000-acre claim. A court appointed master is to determine the legitimacy of the tribe's land claim and, if found justified, determine the amount of water to accompany the land. A recommendation would then be made to the justices, and they would decide whether to accept it. No water would be forthcoming if the tribal land claim is rejected.

In writing for the court, Justice Ruth Bader Ginsburg stated, "We hold that the claims of the United States and the tribe to increased water rights for the disputed boundary lands of Fort Yuma Reservation are not precluded by the consent judgment" in 1983.

In the water-scarce west even this seemingly minimal amount of water is worth fighting over. Arizona and California view water allocated to the tribe as less water for their urban water users.

Court Says No to AZ Appeal to Pre-empt Federal Water Rights

Acting without comment, the Supreme Court rejected an appeal that water rights on federal and Indian lands should not override state law on the use of groundwater. The appeal was in response to an Arizona Supreme Court decision that Indian rights to groundwater trump state-granted rights of cities, mines, etc.

The issue emerged in 1974 during an administrative water-rights proceeding, to later become a state lawsuit to decide water rights in the Gila River basin. In the Gila River case, the federal government is claiming water rights for federal land and Indian reservations, with those rights not just for surface water but also for the groundwater underneath federal lands.

A state judge ruled in favor of the federal government, with the Arizona Supreme Court agreeing last November. The case was returned to the trial judge to decide the water rights for the various Indian reservations, national parks and other federal lands.

Supreme Court rulings dating from 1908 say that a federal land designation may reserve rights to sufficient water to fulfill the purpose of the land. Applying this concept to groundwater beneath federal lands in Arizona would not be compatible with state law. Arizona regulates groundwater differently, not allowing pumpers a specific amount.

In the appeal, corporation and water user groups argued that Arizona law allows a more equal distribution of groundwater and should determine water rights. In support of the appeal, the state's lawyers said the Arizona Supreme Court decision might result in the draining of an aquifer, to the disadvantage of others who use it.

Justice Department lawyers described the appeal as premature and said the state court was correct when it ruled that federal water rights extend to "whatever water source is available."

Organizations involved in the case include Phelps Dodge Corp., Arizona Public Service Co. and the Salt River Valley Water Users' Association.

wastewater infrastructure to stimulate critical investments, the report says. WIN offers a number of possible solutions, including grants, trust funds, loans, and incentives for private investment. "So, the question is not whether the federal government should take more responsibility for drinking water and wastewater improvements," says WIN, "but how."

WIN's membership includes drinking water and wastewater associations; local elected officials; state government organizations; environmental organizations; and associations representing engineers, contractors, fabricators, and water and wastewater equipment manufacturers.

Rain, Snow Turn Profit or Loss With Weather Bonds

Investors in search of profit now have "weather bonds" to consider. Weather bonds made news when Koch industries, a major U.S. provider of heating oil, sold \$50 million worth to investors in early winter. The sale is a landmark, representing the first weather-related securitization as well as the first transfer of a non-financial risk directly to capital markets. Some financial analysts believe that if the concept catches on precipitation bonds might eventually be offered.

Weather bonds spread the risk of weather-related losses from businesses to investors willing to accept the risks for potential high rewards. Industries, such as natural gas and utilities, face financial uncertainties with weather. In fact, an estimated 20 percent of the U.S. economy is directly affected by weather, including temperature, rainfall and snow.

With investors betting for or against a set of historical weather norms, Koch would be better prepared for the financial stress of a bad-weather year. Koch sells energy at a fixed price, and if extreme weather increases the demand for energy, the company is forced to meet the demand by pur-



Arizona Governor Jane Hull, Department of Water Resources Director Rita Pearson and University of Arizona President Peter Likins converse during a May 1-2 conference devoted to the state's Groundwater Management Act. Governor Hull announced at the conference the formation of a Governor's Water Management Commission, to be made up of 20 members from the private and public sectors. Co-chairing the commission will be Rita Pearson, former Senate majority leader John Mawhinney and Growing Smarter Commission chairman Jack Pfister. Governor Hull's other appointments to the commission are expected at any time.

A Technical Advisory Committee made up of representatives from the Active Management Areas is presently functioning and is examining the workings of the GMA at the local AMA level. This technical committee will provide advice and recommendations to the Water Management Commission which will prepare ideas for the 2002 Legislature.

The University of Arizona's Water Resources Research Center sponsored the 20th Anniversary Arizona Groundwater Management Conference.

chasing energy on short notice. The company then takes a financial beating.

Koch's weather bond is a three-year transaction, with risk transferred from a fixed portfolio of 28 weather derivative contracts based on temperatures in 19 U.S. locations. The portfolio is diversified with regard to season, geographical regions and direction of temperature deviation. The portfolio reflects weather risks in Koch's core energy and agricultural businesses.

A feature investors might find attractive is that weather bonds are unaffected by economic forces influencing other investments such as interest rates.

Weather securities have been slow to catch on with investors. Some traders say this is because they are a new product, and it will take time and education before investors are comfortable with them.

Weather derivative contracts were first introduced in the United States two years ago. Since then more than 1,500 have been written, with an estimated value of \$2.5 billion. Since their first listing on the Chicago Mercantile Exchange in September, however, the volume of trade of weather futures has been disappointing. The exchange intends to begin offering the contracts in several more cities this year.

AZ WaterCommunity NEWS

After nearly 14 years with the City of Scottsdale as Water Resources Director/Advisor, **Floyd Marsh** recently joined the Phoenix office of URS Dames and Moore as senior water resources consultant. In his new position, Floyd will have a senior business development and project management role for the water resources business line including water supply planning, management and development. Contact Floyd at 602-861-7450 or e-mail floyd_marshall@urscorp.com

After operating the **Camp Verde Water System** since 1957, **Jim Bullard** is selling the system and retiring. The Town of Camp Verde has expressed interest in acquiring the water company and is in the process of getting an appraisal. For about \$8 million, a buyer would get a water system that delivers about 15 million gallons per year to over 900 billable accounts. For more information call Jim Bullard, 520-567-5281.

Kathleen M. Chavez was appointed to serve as interim director of Pima County Wastewater Management Department. **George A. Brisko** recently retired from the position after 20 years.



Guest View

Fieldwork, a "Vital Gap" in Computer Based Education as Hydrology Students Get Feet Wet

Terri S. Hogue, Ph.D. student in the University of Arizona's Hydrology and Water Resources Program, contributed this Guest View.

Advances in technology have helped to dramatically improve the world of education. Classrooms and teachers have been transformed by the advancement of the web and other high-tech media into their educational systems. This is especially evident in today's graduate programs. Students easily access data and information from all types of sources, including remote satellite systems, government agencies and the World Wide Web. They can use this data as input to highly complex models built to simulate all aspects of the hydrologic cycle, from the stomatal resistance of a single leaf to runoff and streamflow of a major river system such as the Colorado.

The days of graduate students having to spend long hours in the field to collect data are gone. A watershed or regional hydrologic system can be simulated without the student ever putting foot on the soil they are modeling. Students can complete an M.S. or Ph.D. in many science programs, including hydrology, without ever having to step away from the computer. However, this trend in education seems to leave a vital gap in a student's repertoire.

Having recently returned from a ten-day field course, it is evident to this author that there is no substitution for practical application of the theoretical knowledge students receive in the course of their education.

As a Ph.D. student in the Department of Hydrology and Water Resources at the University of Arizona, I have been fortunate to have attended a field hydrology course offered by our department three times: once as a student and twice as a teaching assistant. A modeler myself by "trade," the opportunity to get out in the field and perform hydrology at the watershed scale never fails to interest me, and my knowledge increases several-fold with every venture.

The hydrology "field camp" offered by the Department of Hydrology and Water Resources is a ten-day excursion throughout Arizona to teach surface water techniques and methodologies to undergraduate and graduate students in hydrology and other environmental sciences at the university. Once a requirement in the

course curriculum, but now an elective for graduate students, the camp has declined from its glory days of six weeks and 40 students, to 10 days and 15 students.

Although the camp has declined in size, it is still well supported by agencies such as State Parks of Arizona and the State Land Department. Professionals from these and other private firms come to assist with instruction of the camp. The course teaches various methods in stream gaging, flood-wave analysis, surveying, flume construction, infiltration, evaporation, GPS, physical and chemical limnology and other aspects of hydrology.

Students use techniques to perform analyses such as the water budget of a lake system, calculation of historical flood discharges of

a river and estimation of bank storage for a flood event. It never fails to impress me when a student really grasps the application of specifics from the theoretical side. For example, when using Manning's equation to estimate historical peak flow on the Verde River, many students are excited to actually use and understand something that may at first have seemed abstract.

Several students from this and previous years' field camps have commented on the vast amount of learning that takes place during the ten-day experience. Most re-

mark that more is absorbed in the short amount of time in the field than in a whole semester's worth of classroom instruction. So maybe it's time to re-examine fundamental science education. Do future scientists need to understand the application and physical side of their profession? Should a field course be required for all science graduates?

Granted, fieldwork is not for everyone, and unfortunately, not all future hydrologists will venture out to watersheds and field sites to explore the physical reality of their science. But, for those lucky ones who do have the need or desire to "get out" of the office, there is no substitute for having some background and experience in field techniques and the practical application of their science.

For additional information about the UA Hydrology and Water Resources Surface Water Field Camp, contact: Dennis Scheall, email: dennis@hwr.arizona.edu; phone: 520-621-8786 or Terri Hogue, e-mail: hoguets@hwr.arizona.edu



Dennis Scheall demonstrates evaporation pan methodology to University of Arizona water field camp students. (Photo: Terri Hogue)



Legislation and Law

2000 Legislative Session Enacts Varied Water-Related Legislation

Following are summaries of water-related bills enacted during the 2000 Regular Session and sent to Governor Hull. (Copyright 2000 by Arizona Capitol Times. Reprinted with permission)

Chap 71 S 1508 Water; Non-navigable Streams The Legislature ratifies and adopts Arizona Navigable Stream Adjudication findings of non-navigability for four streams/ivers as of Feb. 14, 1912 – Big Sandy River, Burro Creek, Santa Maria River and Virgin River – and the state by this act disclaims title based on navigability; the Legislature also adopts commission findings, and the state waives title to an estimated 8,218 small and minor water courses in La Paz, Mohave and Yuma counties

Chap 85 H 2611 Water; Exempt Wells Authority to drill a single non-irrigation well exempt from regulation in an active water management area is expanded to allow drilling a second well for the same non-irrigation use at the same location if the first well cannot produce more than 3 gal/min from a 35 gal/min pump.

Chap 129 S 1254 Water; Commercial Use A utility company with a pre-2000 application for a certificate of environmental compatibility can pump 62,500 acre-feet of groundwater from a pumping-restricted area in any ten-year period for electrical generation and related uses. Conditions also are prescribed under which more than 100 acre-feet of groundwater per year can be withdrawn from a restricted area and transported for commercial or industrial use (e.g., the pumping cannot cause a groundwater-table decline of more than 10 ft/yr or exceed 6 acre-feet per year per acre).

Chap 169 H 2182 Water; Stored When a person chooses to drill a well to recover effluent he has stored underground within the service area of a city, water company or irrigation district, the city, company or district must be notified and given an opportunity to offer to recover the water on behalf of the person. The person must consider the offer if the recovery offered is of water of comparable quality to the water the person could recover.

Chap 192 S 1054 Effluent Reuse A “blue ribbon task force on effluent reuse” is created to study how to convince the public to use more effluent. Reports are due Dec. 1, 2000 and 2002. Members are 6 legislators and 10 representatives of various government and private interests.

Chap 205 H 2149 Groundwater; Drought Emergency The director of the state Dept. of Water Resources is required to authorize the otherwise restricted transportation of groundwater away from a groundwater basin if the governor has declared an emergency water shortage; the water is to be taken from an existing well; and the local government where the well is located has consented to the pumping. Further conditions: the water can be transported only by train or motor vehicle, must be required for stock watering or

city water service, will not be used in an active groundwater management area and the local government where the water is to be used must have implemented a program preventing nonessential use of the water. Self-repealing April 30, 2001. Effective April 10, 2000.

Chap 224 S 1354 Water Exchanges Authority to divert water received through a water exchange is expanded to allow diversion if it is groundwater exchanged between an irrigation district and the holder of an irrigation grandfathered right within that district; this type of exchange is exempt from the requirement that the water must be received within 12 months.

Chap 244 S 1184 Water Studies Appropriation Approximation of \$500,000 in FY 00-01 to the Dept. of Water Resources, divided \$330,000 for certain rural water studies and \$170,000 to be transferred to Yavapai County for a hydrologic study of the upper and middle Verde water basins including connectivity of the Big Chino Basin to the Verde River.

Chap 260 S 1264 Water Resources Dept. Continuation The sunset date for the state Dept. of Water Resources is extended ten years, to July 1, 2010. Retroactive to July 1, 2000

Chap 381 H 2409 Floodway Control; Appropriation Appropriation from the fire suppression fund to the Dept. of Emergency & Military Affairs Division of Emergency Management, \$360,000 for part of the cost of Bisbee’s Mule Gulch floodway channel and other disaster-related damage, plus authority for the governor to spend money from the emergency fund for Cochise and Santa Cruz counties’ flash-flood emergencies. Also: if liability exceeding \$4 M is incurred in fiscal 2000-01, an additional \$1.14 M would have been authorized to the emergency fund subject to review of the Joint Legislative Budget Committee. Governor Hull line-vetoed the \$1.14 M authorization, saying it is contingent on other spending, is “inappropriate at this time” and makes the funds subject to JLBC review. “The Emergency Council, not JLBC, currently reviews expenditures from the governor’s emergency fund,” the governor wrote. “I see no need to change that policy.”

Chap 391 S 1509 Water; Irrigation Rights Two formulas are set in law to determine the amount of assured water supply credit for extinguishing an irrigation grandfathered right or a Type 1 non-irrigation grandfathered right (where land has been retired from irrigation) both in the Prescott Active Management Area. The first is to be used through 2021 and includes a calculation to be used if the irrigation acres associated with the extinguished right were irrigated at least five of the six calendar years preceding 2000. The second is to be used after 2021 and makes no reference to pre-2000 irrigation. Conditions are prescribed that must be met for the credit to be established.



Publications

EPA Atlas of America's Polluted Waters

EPA recently published the Atlas of America's Polluted Waters, EPA 840-B-00-002, with maps showing waters within each state not meeting state water quality standards. Over 20,000 water bodies across the country are identified as not meeting water quality standards. The maps are color coded to indicate the type of pollutant. Bar charts show the types of pollutants impairing stream/river/coastal miles, and lakes/estuary/wetland acres. Copies of the document are available at no charge from the National Service Center for Environmental Publications, Cincinnati: Phone: 513-489-8190; Fax: 513-489-8695. A copy of the atlas is posted on the TMDL web site at: <http://www.epa.gov/owow/tmdl/atlas/index.html>

Guides Available to Collections of Arizona Water Information

- Water Holdings in the State Archives
- Arizona Water Survey, An Examination of Water Collections in Arizona Repositories.

Both publications compiled by Tyler Selle

Published by the History and Archives Division of the State of Arizona Department of Library, Archives, and Public Records, these two publications guide researchers and others to water information and materials that are available at various locations in Arizona. One publication concentrates solely on holdings within the State Archives. These holdings include historical records of many of the organizations and individuals responsible for managing the state's water resources. The other publication takes a broader view and lists water-related collections in certain repositories throughout the state, including selected museums and university libraries. Both publications are available from the Arizona State Archives, State Capitol, 1700 W Washington, Phoenix, AZ; phone: 800-255-584. Costs: "Water Holdings..." \$1, "AZ Water Survey..." \$4.

Arizona Water History Archives Project

Douglas E. Kupel

This publication lists a broad and varied range of information sources about Arizona water history, including businesses, historical societies, libraries, and various service organizations. Types of information available at each source also are listed; e.g., diaries, court records, maps and photographs. Published in 1987 this publication is in need of revision and is out of print. A copy exists in the Arizona Archives or can be obtained by contacting Doug Kupel; phone: 602-495-5853; email: dkupel@ci.phoenix.az.us

See feature beginning on page one for discussion of the Arizona State Archives and its collection of water materials.

The Law of Environmental Justice: Theories and Procedures to Address Disproportionate Risk

Edited by Michael Gerrard

The American Bar Association (ABA) published this 829-page treatise on environmental justice laws. The book is divided into three sections. Chapters on theory cover topics including equal protection for minority groups, civil rights issues, state programs and Native American law. Legal procedures topics include public participation, risk assessment and legal ethics. Legal objectives chapters include specifics on halting construction projects, cleaning up and redeveloping polluted facilities, assisting injured individuals and controlling workplace exposure. The publication is available from the ABA's Section of Environment, Energy and Resources by calling 800-285-2221. Students, government agencies and non-profit agencies may purchase copies at a discounted rate of \$75.00. Full price is \$139.95.

The United States Geological Survey recently published the following reports:

- **Aquifer Compaction and Ground-Water Levels in South-Central Arizona**
- **Hydrogeological Investigations of the Sierra Vista Subwatershed of the Upper San Pedro Basin, Cochise County, Southeast Arizona**
- **Ground-Water, Surface-Water and Water Chemistry Data, Black Mesa Area, Northeastern Arizona — 1998**
- **Water Resources Data Arizona Water Year 1999**

The above reports can be purchased from the U.S. Geological Survey, Information Services, Box 25286 Federal Center, Denver, CO 80225-0046, phone 303-202-4210. For additional information about the publications contact District Chief, U.S.G.S., Water Resources Division, 520 N. Park Ave., Suite 221, Tucson, AZ 85719

The above U.S.G.S. report is for sale from the National Technical Information Service, U.S. Department of Commerce, Springfield, Virginia 22161. For additional information contact District Chief, U.S.G.S., Water Resources Division, 520 N. Park Ave., Suite 221; Tucson, AZ 85719-5035.

Border EcoWeb: Guide to Finding Environmental Information About the U.S.-Mexican Border Region Through the Internet

Compiled by: Elena Lelea and Paul Gastner

Intended as a complement to The Border EcoWeb website, this published guide provides an overview of environmental information about the U.S.-Mexico border region and is intended to facilitate public access to such information. The bilingual guide includes instructional materials to teach use of the Internet. The guide specifically details the navigation and contents of the Border EcoWeb website located at www.borderecoweb.sdsu.edu/ The published guide also provides additional resources for those people without access to the Internet. To obtain a copy of the guide, contact the Institute for Regional Studies of the Californias, San Diego State University, 5500 Campanile Drive, San Diego, CA 92182; phone: 619-594-5423; fax: 619-594-5474; email: bew@rohan.sdsu.edu



Special Projects

Photos Urge Public Debate About Western Water Use, Abuse

Understanding water is an interdisciplinary pursuit, to be studied with reference to various scientific fields, the social sciences, engineering, law and public policy, and art. With the Water in the West archive, a group of photographers is artistically exploring the relationship between water and culture in the West, using varied styles for a variety of effects, from whimsy to outrage. The Water in the West archive is located at the University of Arizona's Center for Creative Photography.

Water in the West was shown as an exhibition at the Sheppard Fine Art Gallery in the Art Department at the University of Nevada, Reno, from April 25 through June 16, 1991. The exhibit served as a catalyst for the collaborating photographers to collectively address the question: How can photography play a role in defining public debate about water in the West, its use and misuse? Believing that photography is especially able to convey information and visual insight about the physical world, the photographers decided to establish a Water in the West archive and include their own work, historical photographs and other materials.

Robert Dawson, photographer and photoeducator, and Ellen Manchester, photographic historian and curator, direct the project, with photographers Laurie Brown, Gregory Conniff, Terry Evans, Geoff Fricker, Peter Goin, Wanda Hammerbeck, Sant Khalsa, Mark Klett, Ellen Land-Weber, Sharon Stewart and Martin Stupich.



Car Becoming River Bottom, 1991, photograph by Mark Klett. A recurring cultural theme is the conflict between human activities and environmental values. Is such conflict inevitable? The photo makes an ironic comment on the issue as a junk car becomes a river bottom. Klett contributed to the Central Arizona Project Photograph Survey in 1985-86

The photographers began with the premise that water is a cultural artifact, its manner of use an indication of the values and priorities of a particular society. They therefore consider water to be more than a detail in the landscape, but an essential symbol or metaphor, its use and condition bespeaking much about our values and relationship to the natural world, and more specifically to the

western landscape. The archive includes varied scenes, from photographs of agricultural activities in Kansas, to dams on the Colorado River, to urban conditions in Southern California, with water put to many uses.

What becomes evident when we observe the photographs is that we share a complicated and complex attitude about water. With our engineered strategies to collect and distribute water in these arid and semiarid regions, we tend to think we control and manage this resource. The photographs demonstrate, however, that water is an essential part of both the landscape and cityscape and is capable of surviving human neglect and exploitation, to prevail as a resilient, but still endangered natural resource. Water exists independently of human needs.

Researchers and members of the public wanting to view photographs within the Water in the West archive must make an appointment at the Center of Creative Photography at the University of Arizona.



Los Angeles River near downtown L.A., 1990, photograph by Wanda Hammerbeck. Beyond the derelict fence and parallel to the railroad tracks flows the Los Angeles River, bridged and channeled. It appears to be a river making a last stand within an overwhelming urban setting. Hammerbeck is working on a project to document the Owens Valley and the Los Angeles water system.



Announcements

Help Wanted

Coordinator, Yavapai County Water Advisory Committee, Verde Valley/Prescott, Arizona. Salary: \$55K - \$60K DOE, with comprehensive benefit package. Extensive skills in a PC and LAN/WAN environment; Microsoft Office Professional; ARCVIEW GIS; project management; effectively deal with the public, consultants and government agencies; extensive travel within the Verde River Watershed. For more information call 520-639-8110.

Managing River Flows For Biodiversity: A Conference on Science, Policy, and Conservation Action

Taking Place July 30 – August 2, 2001, at Colorado State University, Fort Collins, Colorado, the conference will hold plenary sessions on the nature of real and perceived conflicts between meeting ecosystem needs and human demands for water, the state of science and policy with respect to flow requirements for biodiversity conservation; and symposia of case studies where practitioners are working to meet human demands for water while also providing for ecological needs. The conference will further feature poster sessions and an educational field trip to nearby Rocky Mountain rivers. "Call for Posters" and registration announcements are coming soon. To receive further information through email, please leave a request at nsilk@tnc.org

Call for Papers

The U.S. Committee on Irrigation and Drainage has issued a call for papers for a Conference on Transbasin Water Transfers, to be held June 27-30, 2001 in Denver, Colorado. The conference will focus on five topics: environmental issues; social, economic, legal, political and diplomatic issues; proposed transbasin transfer projects; evolving issues for existing water projects; and management innovations to facilitate transbasin water transfers. Professionals working in these fields are invited to submit abstracts of proposed papers to be presented at the conference. The deadline for submitting abstracts is August 1, 2000. For more information contact Larry D. Stephens: phone: 303-628-5430; fax: 303-628-5431; email: stephens@uscid.org; or visit www.uscid.org/~uscid

Arizona Water Protection Fund 2000 Grant Funding Cycle

The Arizona Water Protection Fund has approximately \$2 million available this year for public grants for river and riparian restoration, maintenance and enhancement. Due to limited funding this year, grant funds are available only in the capital project, feasibility study and water acquisition categories and projects of less than \$250,000 will be given preference. Funding will not be available in

the research or water conservation categories. The deadline for applications is August 2, 2000 at 3:00 pm. The application manual is available online at www.adwr.state.az.us/awpf. For more information, contact Irmalisa Horton, phone: 602-417-2400 or email ilhorton@adwr.state.az.us

Call for Papers

The International Water Association has issued a call for papers for its fifth international conference on diffuse/nonpoint pollution and watershed management to be held in Milwaukee, Wisconsin, June 10-15, 2001. Papers are solicited for both platform and poster presentations on general themes including: source identification and measurement, water quality impacts, solutions to diffuse pollution, socioeconomic and policy considerations and information management, transfer and exchange. Those wishing to present are requested to submit an abstract of 500 words or less by September 30, 2000. Abstracts may be submitted by mail to Dr. Michael R. Burkart, Program Committee Chairman, National Soil Tilth Laboratory, 2150 Pammel Drive, Ames, Iowa, 50011, or preferably by email in Word or WordPerfect format to burkart@nstl.gov. Please specify the preferred presentation format as poster or platform and provide the name, address and email of the author who will present the paper at the conference.

AWRA 2000 Summer Specialty Conference

The American Water Resources Association will hold a conference on Riparian Ecology and Management in Multi-Land Use Watersheds on August 28-31, 2000 at the Doubletree Portland/Lloyd Center Hotel in Portland Oregon. Conference topics include the inter-relationships among the social, economic and ecological aspects of riparian management and restoration in multi land-use watersheds; human influences in varying land use settings; and new approaches and techniques for riparian characterization, assessment and restoration. For more information, contact American Water Resources Association, 4 West Federal Street, P.O. Box 1626, Middleburg, VA 20118-1626, phone: 540-687-8390; fax: 540-687-8395; email: info@awra.org; website: www.awra.org

Universities Council on Water Resources Conference

Entitled "Living Downstream in the Next Millennium: Reconciling Watershed Concerns with Basin Management," this conference will feature sessions on a variety of topics related to watershed management and basin management. The conference will take place August 1-4, 2000 at the Hilton New Orleans Riverside in New Orleans, Louisiana. Registration is \$380 until July 3, and \$430 after July 3. Further information is available at the UCOWR office, phone: 618-536-7571; fax: 618-453-2671; email: ucowr@uwin.siu.edu



Calendar of Events



RECURRING



Arizona Hydrological Society (Flagstaff). 2nd Tuesday of the month (during the school year). Meeting times and locations may vary, NAU, Southwest Forest and Science Complex, 2500 S. Pine Knoll Dr., Room 136, Flagstaff. Contact: Abe Springer 520-523-7198, email: abe.springer@nau.edu

Arizona Hydrological Society (Phoenix). Usually 2nd Tuesday of the month. Contact: Christie O'Day 602-379-3087, ext 224.

Arizona Hydrological Society (Tucson). Usually 2nd Tuesday of the month. Contact: Mike Block 520-575-8100 or mblock@metrowater.com

Arizona Water Banking Authority (Phoenix). Next quarterly meeting will be held on Sept. 13 at the ADWR in Phoenix. Contact: Nan Flores 602-417-2418.

Arizona Water for People Committee. Phoenix, meets on the 2nd Thursday of even-numbered months at City of Phoenix Squaw Peak Facilities, 6202 N. 24th St., Phoenix at 6 p.m. Contact Dave Christiana 602-417-2400, ext 7339; Tucson, meets the 3rd Thursday of even-numbered months. Time and place varies. Contact Sheila Bowen, 520-625-8409 or sbowen@communitywater.com

Arizona Water Protection Fund Commission. Contact: Irma Lisa Horton 602-417-2400 ext. 7016.

Arizona Water Resources Advisory Board. Contact: Kathy Donoghue 602-417-2410.

Central Arizona Water Conservation District. Usually 1st and 3rd Thursdays of the month, time to be determined one week in advance. CAP Board Room, 23636 N. 7th St., Phoenix. Contact: Ardis McBee 602-869-2210.

City of Tucson Citizens Water Advisory Committee. Usually 1st Tuesday of the month, 7:00-9:00 a.m., 310 W. Alameda, Tucson. Contact: John O'Hara 520-791-5080 ext. 1446.

Maricopa Association of Governments/Water Quality Advisory Committee. Contact: Lindy Bauer 602-254-6308.

Maricopa County Flood Control Advisory Board. Usually 4th Wednesday of the month, 2:00 p.m., 2801 W. Durango, Phoenix. Contact: Kathy Smith 602-506-1501.

Phoenix AMA, GUAC. Scheduled monthly, please call. Conference Room A, 500 N. 3rd St. Phoenix. Contact: Mark Frank 602-417-2465.

Pima Assoc. of Governments Water Quality Subcommittee. Usually 3rd Thursday of the month, 9:00 a.m., 177 N. Church St., Suite 405, Tucson. Contact: Gregg Hess 520-792-1093.

Pinal AMA, GUAC. Usually 3rd Thursday of the month, 2:00 pm. Pinal AMA Conference Room, 1000 E. Racine, Casa Grande. Contact: Randy Edmond 520-836-4857.

Prescott AMA, GUAC. 2200 E. Hillsdale Rd., Prescott. Contact: Phil Foster 520-778-7202.

Santa Cruz AMA, GUAC. Usually 3rd Wednesday of the month, 9:00 am, Santa Cruz AMA Conference Room, 857 W. Bell Rd, Suite 3, Nogales. Contact: Kay Garrett 520-761-1814.

Tucson AMA, GUAC. Usually 3rd or 4th Friday of the month, 9:00 a.m., Tucson AMA Conference Room, 400 W. Congress, Suite 518, Tucson. Contact: Kathy Jacobs 520-770-3800.

Tucson AMA, Safe Yield Task Force. Every Wednesday. Contact Kathy Jacobs 520-770-3800.

Verde Watershed Association. Contact: John Parsons and Tom Bonomo, VWA Newsletter Editors, Verde Watershed Association, P.O. Box 4595, Camp Verde, AZ, 86322. 520-567-2496. Message phone: 520-649-9978, email: verdewatershed@yahoo.com; website <http://vwa.southwest-water.org>

Water Users Association of Arizona. 2nd Friday of the month at noon (except in September). Call for reservations and exact location. Contact: Paul Gardner, 480-987-3240.

Yavapai County Flood Control District Board of Directors. Contact: Ken Spedding, 520-771-3197.

UPCOMING



August 3-4, 2000 Arizona Water Law Conference: Water Quality, Quantity and Rights, presented by CLE International at the Marriott Camelback in Scottsdale. The Conference will cover topics such as creative water quality management; Canyon Forest Village: a case study; and the law of the Colorado River, with feature presentations by Rita P. Pearson, Director, Arizona Department of Water Resources and Karen L. Smith, Ph.D., Director of Water Quality, Arizona Department of Water Quality. For more information, contact: CLE International 1541 Race Street, Denver, CO, 80206; phone: 800-873-7130; fax: 303-321-6320; email: www.cle.com

September 20-22, 2000 Arizona Hydrological Society Symposium 2000. This year's symposium, entitled "Environmental Technology for the 21st Century," takes place at the Holiday Inn Crowne Plaza Hotel in Phoenix. The symposium will examine environmental technology and planning for the 21st century with a special emphasis on the Southwestern urban environment. The symposium will also include a special panel discussion devoted to the effect of the hydrologic impacts of rapid urban growth. For more information contact: AHS Symposium 2000, c/o URS Greiner Woodward Clyde, 7878 North 16th Street, Suite 200, Phoenix, AZ, 85020; email: ahs2000@urscorp.com

Continued from page 2

caused flooding in the building earlier this year and destroyed records. Work is underway to find a more suitable location for materials currently stored at the records center.

Problems other than facilities also beset the archives. That the archives are mandated by law to collect government records does not ensure that various government agencies will in fact assign their materials to the facility. With administrators mainly occupied with current business and affairs, the fate of old files and records doesn't necessarily attract priority attention. Also, the workings of government create a great variety of materials that then need to be sorted into what is and isn't suitable for the archives. Staff members who work with records at various agencies are often clerks without the training to judge the value of the materials they handle, with the result that much gets tossed.

Some kind of outreach effort clearly is needed, to involve outside agencies in a partnership with the State Archives to preserve important materials. Sturgeon says, "We need a full-time field archivist to go to the agencies and look at their historical records to get an idea of what is out there. We respond to so many research requests and have so many collections to process that we can't always get out and do what we need to do."

The field archivist would be able not only to identify materials for the archives, but also raise administrators' consciousness about the importance of preserving historical records, at the agency and eventually within the state archives. Responsible not only for storing state records but also materials from other political subdivisions of the state, i.e., counties and cities, the archives must build cooperation and support at different levels.

Only some of Arizona Department of Water Resources records

have been submitted to the State Archives, mainly relating to administration and engineering. The Department of Environmental Quality keeps their records in-house for use of researchers.

Although the State Archives is designated as the depository for all state records, researchers quickly discover that original copies of government documents are in fact scattered at various locations throughout the state. Such materials often are safe and secure, but their placement at varied sites frustrates the mission of State Archives, not to mention complicating the task of researchers wanting access to the material.

(Two recent publications identify collections of water documents at the Arizona State Archives as well as other repositories throughout the state. See "Publications" section, page 8, for information about these publications.)

Meeting the long-standing need for a new Arizona Archives building is a necessary legislative step if the state is to significantly improve its archival services. Arizona's quest for such a building, however, is a tale of a need recognized but unmet.

In its 1999 "Sunset Review" of the Department of Library Archives and Public Records, the National Council of State Legislatures noted that the DLAPR is out of compliance with statutory mandates because "it lacks adequate storage space and because current conditions jeopardize the archival material." NCSL recommended that "the Legislature should expand storage space for the Arizona archives collection" as its first priority.

Friends of Arizona Archives is an organization devoted to "promoting proper care of and improved access to Arizona's historical records." Top on FAZA's agenda is the construction of a new State Archives building, to be built on the Capitol Mall. In pursuit of this objective, FAZA seeks Legislative approval for \$20 million to construct the new facility.



Water Resources Research Center
College of Agriculture
The University of Arizona
350 N. Campbell Ave
Tucson, AZ 85721
Address Service Requested

NON-PROFIT ORG.
US POSTAGE
PAID
TUCSON, ARIZONA
PERMIT NO. 190
